ASSIGNMENT 1

Textbook assignment: Chapter 1, “Wave Propagation,” pages 1-1 through 1-48.

1-1. What is the major advantage of the telegraph over earlier methods of communication?

1. Range
2. Speed
3. Security
4. Reliability

1-2. The spreading out of radio waves is referred to as propagation and is used in which of the following Navy equipment?

1. Detection
2. Communication
3. Radar and navigation
4. Each of the above

1-3. Radio-frequency waves CANNOT be seen for which of the following reasons?

1. Because radio-frequency energy is low powered
2. Because radio-frequency waves are below the sensitivity range of the human eye
3. Because the human eye detects only magnetic energy
4. Because radio-frequency waves are above the sensitivity range of the human eye

1-4. Radio waves travel at what speed?

1. Speed of sound
2. Speed of light
3. Speed of the Earth's rotation
4. Speed of the Earth's orbit around the sun

1-5. Which of the following types of energy CANNOT be seen, heard, or felt?

1. Radio waves
2. Sound waves
3. Heat waves
4. Light waves

1-6. A stone dropped into water creates a series of expanding circles on the surface of the water. This is an example of which of the following types of wave motion?

1. Transverse
2. Concentric
3. Longitudinal
4. Compression

1-7. A sound wave that moves back and forth in the direction of propagation is an example of which of the following types of wave motion?

1. Composite
2. Concentric
3. Transverse
4. Longitudinal

1-8. Which of the following terms is used for the vehicle through which a wave travels from point to point?

1. Medium
2. Source
3. Detector
4. Receiver

1-9. Which of the following is NOT an element necessary to propagate sound?

1. Medium
2. Source
3. Detector
4. Reference

1-10. If a wave has a velocity of 4,800 feet per second and a wave-length of 5 feet, what is the frequency of the wave?

1. 9.6 Hz
2. 96 Hz
3. 960 Hz
4. 9,600 Hz

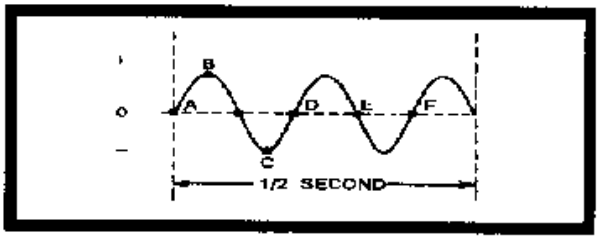

Figure 1-A.—Waveform.

IN ANSWERING QUESTIONS 1-11 THROUGH 1-15, REFER TO FIGURE 1-A.

1-11. The waveform in the figure is what type of wave?

1. Sine
2. Square
3. Sawtooth
4. Trapezoidal

1-12. The distance between which of the following points represents the completion of a full cycle of alternating current?

1. A to C
2. B to D
3. C to E
4. D to F

1-13. The distance between which of the following points represents a full wavelength?

1. A to D
2. A to E
3. D to E
4. E to F

1-14. What is the frequency of the wave?

1. 0.5 Hz
2. 2.5 Hz
3. 5.0 Hz
4. 7.5 Hz

1-15. What is the period of the wave?

1. 100 milliseconds
2. 200 milliseconds
3. 250 milliseconds
4. 500 milliseconds

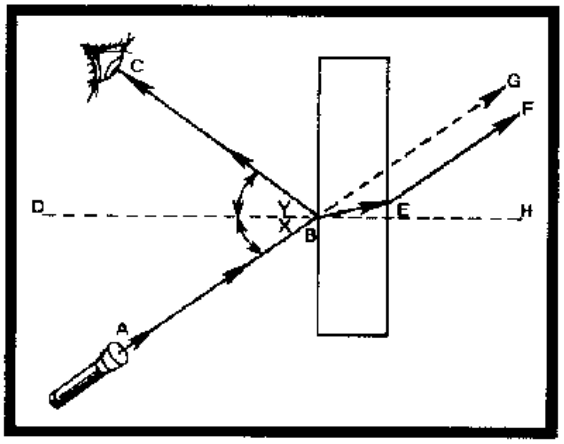

Figure 1-B.—Wave angles.

IN ANSWERING QUESTIONS 1-16 THROUGH 1-19, REFER TO FIGURE 1-B.

1-16. What line in the figure indicates the incident wave?

1. A to B
2. B to E
3. C to B
4. D to H

1-17. Angle "x" is which of the following angles?

1. Normal
2. Incidence
3. Reflection
4. Refraction

1-18. Line E to F represents which of the following waves?

1. Normal
2. Incident
3. Refracted
4. Reflected

1-19. Line D to H represents which of the following references?

1. Normal
2. Perpendicular
3. Both 1 and 2 above
4. Reflected line

1-20. Which of the following statements about a wave is the law of reflection?

1. The angle of incidence is equal to the refracted wave
2. The angle of incidence is not equal to the refracted wave
3. The angle of incidence is equal to the angle of reflection
4. The angle of incidence is not equal to the angle of reflection

1-21. If a wave passes first through a dense medium and then through a less dense medium, which of the following angle-of-refraction conditions exists?

1. The angle of refraction is greater than the angle of incidence
2. The angle of refraction is less than the angle of incidence
3. The angle of refraction is equal to the angle of incidence
4. The wave will pass through in a straight line

1-22. The reception of an AM-band radio signal over mountains can be explained by which of the following principles of wave propagation?

1. Reflection
2. Refraction
3. Diffraction
4. Doppler effect

1-23. What wave propagation principle accounts for the apparent increase in frequency as a train whistle approaches and the apparent decrease in frequency as it moves away?

1. Refraction
2. Reflection
3. Diffraction
4. Doppler effect

1-24. Longitudinal wave disturbances that travel through a medium are known as what type of waves?

1. Air
2. Sound
3. Radio
4. Light

1-25. What are the three audible frequency ranges?

1. Subsonic, sonic, and supersonic
2. Infrasonic, sonic, and ultrasonic
3. Infrasonic, subsonic, and ultrasonic
4. Infrasonic, subsonic, and supersonic

1-26. If a bell is placed in a jar and the air in the jar is replaced with a gas of a higher density, what is the effect, if any, on the speed of the sound when the bell is rung?

1. The sound stops
2. The sound travels faster
3. The sound travels slower
4. The sound is not affected

1-27. Varying which of the following wave characteristics will cause the length of sound waves to vary?

1. Phase
2. Quality
3. Amplitude
4. Frequency

1-28. What are the three basic characteristics of sound?

1. Amplitude, intensity, and quality
2. Amplitude, pitch, and tone
3. Pitch, intensity, and quality
4. Pitch, frequency, and quality

1-29. If several musical instruments are playing the same note, you should be able to distinguish one instrument from another because of which of the following characteristics of sound?

1. Quality
2. Overtones
3. Frequency
4. Intensity

1-30. Through which of the following mediums will sound travel fastest, at the indicated temperature?

1. Air at 68º F
2. Lead at 20º C
3. Steel at 32º F
4. Steel at 20º C

1-31. In sound terminology, which of the following terms is the same as a wave reflection?

1. Echo
2. Image
3. Acoustics
4. Refraction

1-32. Multiple reflections of sound waves are referred to as

1. noise
2. acoustics
3. interference
4. reverberation

1-33. Two out-of-phase waves of the same frequency that are moving through the same medium are said to present which of the following types of interference?

1. Additive
2. Constructive
3. Both 1 and 2 above
4. Subtractive

1-34. A cavity that vibrates at its own natural frequency and produces a sound that is louder than at other frequencies is demonstrating which of the following sound characteristics?

1. Noise
2. Quality
3. Resonance
4. Reverberation

1-35. Energy in the form of light can be produced through which of the following means?

1. Chemical
2. Electrical
3. Mechanical
4. Each of the above

1-36. The scientist, J. C. Maxwell, developed the theory that small packets of electromagnetic energy called photons produce

1. sound
2. noise
3. echoes
4. light

1-37. A large volume of light radiating in a given direction is referred to as a

1. ray
2. beam
3. shaft
4. pencil

1-38. Which of the following units of measurement is/are used to measure very short wavelengths of light?

1. Angstrom (Å)
2. Millimicron
3. Both 1 and 2 above
4. Millimeter

1-39. What are the primary colors of light?

1. Red, blue, and yellow
2. Red, blue, and green
3. Red, violet, and indigo
4. Blue, green, and violet

1-40. What are the secondary colors of light?

1. Orange, yellow, and blue-green
2. Magenta, yellow, and cyan
3. Purple, yellow, and black
4. Red, white, and blue

1-41. What causes sunlight to separate into different wavelengths and display a rainbow of colors when passed through a prism?

1. Refraction
2. Reflection
3. Dispersion
4. Diffraction

1-42. The sun, gas flames, and electric light filaments are visible because they are

1. opaque
2. transparent
3. nonluminous
4. self-luminous

1-43. Substances that transmit almost all of the light waves falling upon them possess which of the following properties?

1. Opaqueness
2. Transparence
3. Translucence
4. Self-lumination

1-44. Some substances are able to transmit light waves but objects cannot be seen through them. Which of the following properties does this statement describe?

1. Opaqueness
2. Transparence
3. Translucence
4. Self-lumination

1-45. The speed of light depends on the medium through which light travels. For which of the following reasons does light travel through empty space faster than through an object such as glass?

1. Space is less dense than glass
2. Space is more dense than glass
3. Glass reflects the light back to the source
4. Glass refracts the light, causing the light to travel in all directions

1-46. If a light wave strikes a sheet of glass at a perpendicular angle, what is the effect, if any, on the light wave?

1. The wave is completely absorbed
2. The wave is reflected back toward the source
3. The wave is refracted as it passes through the glass
4. The wave is unchanged and continues in a straight line

1-47. The amount of absorption of the light that strikes an object is determined by the object's

1. color
2. purity
3. density
4. complexity

1-48. In a comparison of waves of light and sound as they travel from an air into water, how is the speed of (a) light waves and (b) sound waves affected?

1. (a) Increased (b) increased
2. (a) Increased (b) decreased
3. (a) Decreased (b) decreased
4. (a) Decreased (b) increased

1-49. Which of the following waves are NOT a form of electromagnetic energy?

1. Heat waves
2. Sound waves
3. Light waves
4. Radio waves

1-50. The electromagnetic spectrum represents the entire range of electromagnetic waves arranged in the order of their

1. color
2. frequency
3. visibility
4. application

1-51. Which of the following portions of the frequency spectrum contains the highest frequency?

1. X-ray
2. Radar
3. Light
4. Cosmic

1-52. Which of the following electronic devices is used to radiate and/or collect electromagnetic waves?

1. Antenna
2. Receiver
3. Transmitter
4. Transmission line

1-53. The electric field and magnetic field combine to form which of the following types of waves?

1. Spherical
2. Elliptical
3. Electromagnetic
4. Each of the above

1-54. The magnetic field radiated from an antenna is produced by what electrical property?

1. Voltage
2. Current
3. Reactance
4. Resistance

1-55. The electric field radiated from an antenna is produced by what electrical property?

1. Voltage
2. Current
3. Reactance
4. Resistance

1-56. Applying rf energy to the elements of an antenna results in what phase relationship between voltage and current?

1. Voltage lags current by 90 degrees
2. Voltage leads current by 90 degrees
3. Voltage and current are 180 degrees out of phase
4. Voltage and current are in phase

1-57. What field exists close to the conductor of an antenna and carries the current?

1. Electric
2. Magnetic
3. Induction
4. Radiation

1-58. What field travels through space after being detached from the current-carrying rod of an antenna?

1. Electric
2. Magnetic
3. Induction
4. Radiation

1-59. Electric and magnetic fields on an antenna reach their maximum intensity at which of the following times?

1. When they are a full cycle apart
2. When they are three-quarter cycle apart
3. When they are a half-cycle apart
4. When they are a quarter-cycle apart